

1. A method of providing automated assistance in configuring customer premises equipment for communication with another network element, comprising:

assisting a user in configuring the customer premises equipment for use with the identified virtual channel and/or protocol.

3. The method of Claim 1, wherein automatically identifying a virtual channel and/or protocol valid for configuration comprises initiating identification of the valid virtual channel and/or protocol without prompting the user for input.

25 4. The method of Claim 1, wherein automatically
identifying a virtual channel and/or protocol valid for
configuration comprises identifying the valid virtual
channel and/or protocol without accessing a memory storing
the identification of the valid virtual channel and/or
30 protocol.

5. The method of Claim 1, wherein automatically determining a virtual channel and/or a protocol valid for configuration with the customer premises equipment comprises:

5 communicating over a virtual channel and toward a destination network element a probing configuration signal; receiving over the virtual channel a response to the configuration signal; and

10 identifying as valid for configuration the virtual channel and/or protocol associated with the response.

6. The method of Claim 5, wherein the probing configuration signal comprises an F5 Operations, Administration, and Maintenance loopback signal.

15 7. The method of Claim 5, wherein the probing configuration signal comprises a signal having a self configuring protocol.

20 8. The method of Claim 7, wherein the probing configuration signal comprises a Dynamic Host Configuration Protocol request, a Link Control Protocol Configuration Packet, or a Point-to-Point Over Ethernet (PPOE) PADI packet.

25 9. The method of Claim 8, wherein the protocol comprises an Internet over ATM protocol.

30 10. The method of Claim 8, wherein the protocol comprises a Point-to-Point over Asynchronous Transfer Mode protocol or a Point-to-Point over Ethernet protocol.

11. The method of Claim 5, wherein communicating the probing configuration signal comprises communicating the probing configuration signal over a plurality of virtual channels.

5

12. The method of Claim 11, wherein communicating the probing configuration signal over a plurality of virtual channels comprises communicating the signal over a first plurality of virtual channels that are likely to return a response.

10

13. The method of Claim 5, wherein communicating the probing configuration signal comprises:

communicating the signal over a first virtual channel;
and

15

communicating the signal over a second virtual channel before a time out value associated with the signal communicated over the first virtual channels expires.

20

14. The method of Claim 5, wherein communicating the probing configuration signal comprises:

communicating a first probing communication signal over a virtual channel; and

25

communicating a second probing configuration signal over the same virtual channel before a time out value associated with the first probing configuration signal expires.

30

15. The method of Claim 5, wherein communicating the probing configuration signal comprises communicating over a virtual channel a plurality of probing configuration signals, each signal associated with a different protocol.

16. The method of Claim 5, wherein communicating the probing configuration signal comprises communicating a plurality of probing configuration signals approximately simultaneously.

5

17. The method of Claim 16, wherein communicating a plurality of probing configuration signals approximately simultaneously comprises:

10 spawning a plurality of threads, each thread operable to process signals associated with at least one virtual channel;

communicating a probing configuration signal over a plurality of virtual channels; and

15 monitoring the probing configuration signal associated with each virtual channel using a separate thread.

18. The method of Claim 16, wherein communicating a plurality of probing configuration signals approximately simultaneously comprises communicating a plurality of probing signals approximately back-to-back over at least one virtual channel.

19. The method of Claim 1, wherein assisting a user in configuring the customer premises equipment for use with the identified virtual channel and/or protocol comprises:

25 displaying the valid virtual channel and/or protocol to a user;

receiving the user's selection of the valid virtual channel and/or protocol; and

30 configuring the customer premises equipment for operation using selected virtual channel and/or protocol.

0371207 114437

20. The method of Claim 1, wherein assisting a user in configuring the customer premises equipment for use with the identified virtual channel and/or protocol comprises automatically configuring the customer premises equipment for operation using the valid virtual channel and/or protocol.

21. The method of Claim 1, further comprising:
communicating a diagnostic signal toward a destination network element; and
determining connectivity of a network layer based on whether a response to the diagnostic signal is received.

22. The method of Claim 21, wherein the diagnostic signal comprises a Protocol Internet Groper ("PING") signal operable to test an Internet Protocol layer of the network.

23. The method of Claim 21, wherein the diagnostic signal comprises a domain name server resolution request signal operable to test a Transmission Protocol layer of the network.

24. The method of Claim 21, wherein the diagnostic signal comprises a Hypertext Transmission Protocol request signal operable to test an Application layer of the network.

25. The method of Claim 21, further comprising reporting on the connectivity of a network layer based on whether a response to the diagnostic signal is received.

26. The method of Claim 1, wherein the customer premises equipment comprises a modem.

27. A computer readable medium operable to execute the following steps on a processor of a computer:

automatically identifying a virtual channel and/or a protocol valid for configuration with the customer premises equipment; and

assisting a user in configuring the customer premises equipment for use with the identified virtual channel and/or protocol.

28. The computer readable medium of Claim 27, wherein automatically identifying a virtual channel and/or protocol valid for configuration comprises identifying the valid virtual channel and/or protocol without prompting the user for information identifying the valid virtual channel and/or protocol.

29. The computer readable medium of Claim 27, wherein automatically identifying a virtual channel and/or protocol valid for configuration comprises initiating identification of the valid virtual channel and/or protocol without prompting the user for input.

30. The method of Claim 27, wherein automatically identifying a virtual channel and/or protocol valid for configuration comprises identifying the valid virtual channel and/or protocol without accessing a memory storing the identification of the valid virtual channel and/or protocol.

31. The computer readable medium of Claim 27, wherein automatically determining a virtual channel and/or a protocol valid for configuration with the customer premises equipment comprises:

5 communicating over a virtual channel and toward a destination network element a probing configuration signal; receiving over the virtual channel a response to the configuration signal; and

10 identifying as valid for configuration the virtual channel and/or protocol associated with the response.

32. The computer readable medium of Claim 31, wherein the probing configuration signal comprises an F5 Operations, Administration, and Maintenance loopback signal.

33. The computer readable medium of Claim 31, wherein the probing configuration signal comprises a signal having a self configuring protocol.

34. The computer readable medium of Claim 31, wherein communicating the probing configuration signal comprises communicating the probing configuration signal over a plurality of virtual channels.

35. The computer readable medium of Claim 31, wherein communicating the probing configuration signal over a plurality of virtual channels comprises communicating the signal over plurality of virtual channels likely to return a response.

36. The computer readable medium of Claim 31, wherein communicating the probing configuration signal comprises:

communicating the signal over a first virtual channel;
and

5 communicating the signal over a second virtual channel before a time out value associated with the signal communicated over the first virtual channels expires.

37. The computer readable medium of Claim 31, wherein communicating the probing configuration signal comprises:

10 communicating a first probing communication signal over a virtual channel; and

communicating a second probing configuration signal over the same virtual channel before a time out value associated with the first probing configuration signal expires.
15

38. The computer readable medium of Claim 31, wherein communicating the probing configuration signal comprises

20 communicating over a virtual channel a plurality of probing configuration signals, each signal associated with a different protocol.

39. The computer readable medium of Claim 31, wherein communicating the probing configuration signal comprises

25 communicating a plurality of probing configuration signals approximately simultaneously.

40. The computer readable medium of Claim 39, wherein communicating a plurality of probing configuration signals approximately simultaneously comprises:

5 spawning a plurality of threads, each thread operable to process signals associated with at least one virtual channel;

communicating a probing configuration signal over a plurality of virtual channels; and

10 monitoring the probing configuration signal associated with each virtual channel using a separate thread.

41. The computer readable medium of Claim 39, wherein communicating a plurality of probing configuration signals approximately simultaneously comprises communicating a plurality of probing signals approximately back-to-back over at least one virtual channel.

42. The computer readable medium of Claim 27, wherein assisting a user in configuring the customer premises equipment for use with the identified virtual channel and/or protocol comprises:

displaying the valid virtual channel and/or protocol to a user;

25 receiving the user's selection of the valid virtual channel and/or protocol; and

configuring the customer premises equipment for operation using selected virtual channel and/or protocol.

43. The computer readable medium of Claim 27, wherein assisting a user in configuring the customer premises equipment for use with the identified virtual channel and/or protocol comprises automatically configuring the customer premises equipment for operation using the valid virtual channel and/or protocol.

communicating a diagnostic signal toward a destination network element; and

45. The computer readable medium of Claim 44, wherein the diagnostic signal comprises a signal selected from a group consisting of a Protocol Internet Groper ("PING") signal, a domain name server resolution request signal, and a Hypertext Transmission Protocol request signal.

47. The computer readable medium of Claim 27, wherein the customer premises equipment comprises a modem.

48. An apparatus operable to provide automated assistance in configuring customer premises equipment, the apparatus comprising:

5 a configuration manager operable to automatically identify a virtual channel and/or a protocol valid for configuration with the customer premises equipment; and

10 a memory accessible to the configuration manager and operable to store an identifier of a valid virtual channel based on the response to the probing configuration signal.

15 49. The apparatus of Claim 48, wherein the configuration manager is operable to identify the virtual channel and/or protocol valid for configuration without prompting the user for information identifying the valid virtual channel and/or protocol prior to the valid virtual channel and/or protocol being determined.

20 50. The apparatus of Claim 48, wherein the configuration manager is operable to initiate identification of the valid virtual channel and/or protocol valid for configuration without prompting the user for input prior to the virtual channel and/or protocol being determined.

25 51. The apparatus of Claim 48, wherein the configuration manager is operable to identify the valid virtual channel and/or protocol valid for configuration without accessing a memory storing the identification of the valid virtual channel and/or protocol.

52. The apparatus of Claim 48, wherein the configuration manager comprises a configurator operable to initiate communication of a probing configuration signal over a virtual channel and toward a destination network element, to receive a response to the configuration signal, and to identify as valid for configuration the virtual channel and/or protocol associated with the response.

53. The apparatus of Claim 52, wherein the probing configuration signal comprises an F5 Operations, Administration, and Maintenance loopback signal.

54. The apparatus of Claim 52, wherein the probing configuration signal comprises a signal having a self configuring protocol.

55. The apparatus of Claim 54, wherein the probing configuration signal comprises a Dynamic Host Configuration Protocol request, a Link Control Protocol Configuration Packet, or a Point-to-Point Over Ethernet (PPOE) PADI packet.

56. The apparatus of Claim 52, wherein the configurator is operable to spawn a plurality of threads, each thread associated with a different virtual channel and operable to determine whether the virtual channel is valid for configuration with the customer premises equipment.

57. The apparatus of Claim 52, wherein the configurator is operable to communicate a probing configuration signal toward a destination network element over a first virtual channel and to determine whether the first virtual channel is valid for configuration with the customer premises equipment.

58. The apparatus of Claim 57, wherein the configurator is further operable to communicate the signal over a second virtual channel before a time out value associated with the signal communicated over the first virtual channel expires.

59. The apparatus of Claim 52, wherein the configurator is further operable to, before a time out value associated with the probing configuration signal expires, communicate another probing configuration signal over the same virtual channel.

60. The apparatus of Claim 52, wherein configurator is operable to communicate over a virtual channel a plurality of probing configuration signals, each signal associated with a different protocol.

61. The apparatus of Claim 52, wherein the configurator is operable to communicate over a virtual channel a packet comprising a plurality of probing configuration signals, each signal associated with a different protocol.

62. The apparatus of Claim 52, wherein the configuration manager is further operable to automatically configure the customer premises equipment for operation using a virtual channel carrying the response or a protocol associated with the response.

0974207 "4400
004446

5 determine the connectivity of a network layer based on
whether a response to the diagnostic signal is received.

10

15

20

67. The apparatus of Claim 48, wherein the configuration manager resides within a modem at a customer's premises.

communicating over a virtual channel and toward a destination network element a probing configuration signal;

identifying as valid for configuration the virtual channel and/or protocol associated with the response.

69. The method of Claim 68, wherein the probing configuration signal comprises a signal selected from the group consisting of an F5 Operations, Administration, and Maintenance loopback signal, a Dynamic Host Configuration Protocol request, a Link Control Protocol Configuration Packet, or a Point-to-Point Over Ethernet (PPOE) PADI packet.

70. The method of Claim 68, wherein communicating the probing configuration signal comprises communicating the probing configuration signal over a plurality of virtual channels approximately simultaneously.

71. The method of Claim 70, wherein communicating a plurality of probing configuration signals approximately simultaneously comprises:

spawning a plurality of threads, each thread operable to process signals associated with at least one virtual channel;

communicating a probing configuration signal over a plurality of virtual channels; and

monitoring the probing configuration signal associated with each virtual channel using a separate thread.

5 72. The method of Claim 70, wherein communicating a plurality of probing configuration signals approximately simultaneously comprises communicating a plurality of probing signals approximately back-to-back over at least one virtual channel.

 73. The method of Claim 68, wherein communicating the probing configuration signal comprises:

10 communicating the signal over a first virtual channel;
 and

 communicating the signal over a second virtual channel before a time out value associated with the signal communicated over the first virtual channels expires.

15 74. The method of Claim 68, wherein communicating the probing configuration signal comprises:

 communicating a first probing communication signal over a virtual channel; and

20 communicating a second probing configuration signal over the same virtual channel before a time out value associated with the first probing configuration signal expires.

 75. The method of Claim 68, further comprising:

25 displaying the valid virtual channel and/or protocol to a user;

 receiving the user's selection of the valid virtual channel and/or protocol; and

30 configuring the customer premises equipment for operation using selected virtual channel and/or protocol.

76. The method of Claim 68, further comprising automatically configuring the customer premises equipment for operation using the valid virtual channel and/or protocol.

5

77. The method of Claim 68, further comprising:
communicating a diagnostic signal toward a destination network element; and

10 determining connectivity of a network layer based on whether a response to the diagnostic signal is received.

15 78. The method of Claim 77, wherein the diagnostic signal comprises a signal selected from the group consisting of a Protocol Internet Groper ("PING") signal, a domain name server resolution request signal, and a Hypertext Transmission Protocol request signal.

20 79. The method of Claim 77, further comprising reporting on the connectivity of a network layer based on whether a response to the diagnostic signal is received.